Landforms and Oceans

5.3 The student will demonstrate an understanding of features, processes, and changes in Earth's land and oceans. (Earth Science)

5-3.4 Explain how waves, currents, tides, and storms affect the geologic features of the ocean shore zone (including beaches, barrier islands, estuaries, and inlets).
Taxonomy level: 2.7-B Understand Conceptual Knowledge

Previous/Future knowledge: In 4th grade (4-4.4), students summarized the conditions and effects of severe weather phenomena including thunderstorms and hurricanes. The concept of the geologic features of the ocean shore zone is new content for this grade.

It is essential for students to know that the area where the ocean meets the land is called the *ocean shore zone*. The ocean shore zone has distinct geologic features that can be affected by waves, currents, tides, and storms. Beaches, barrier islands, estuaries, and inlets are all affected by these natural processes.

Beaches

- The *shoreline,* or *coast*, is the area where the land meets the ocean.
- Some shorelines are rocky. Shorelines made of sand are called *beaches*.
- Shorelines are always changing because of wind and water.
- Waves can wear away the land and expose a rocky shore or the waves can deposit sand along the shore and form a beach. If the waves reach the beach at an angle, the sand is moved along the coast.
- Currents, called *longshore currents*, along the shoreline can move sand from one location to another.
- Tides can bring in sand, shells, and ocean sediments at high tide and leave them behind when the tide goes out.
- Storms can cause wave action that removes sand from beaches.

Barrier islands

- Islands are pieces of land surrounded by water on all sides. Islands with sandy beaches are called *barrier islands*.
- These barrier islands are naturally occurring and function to protect the mainland from the effects of waves on its shore.
- As the waves deposit sand on the beaches, the shapes of the barrier islands change.
- Currents can move the sand from one end of the island to the other.

Estuaries

- All rivers flow into the oceans.
- The area where a river meets the ocean is known as an *estuary*.
- Estuaries have a mixture of freshwater and saltwater.
- Waves can deposit sand in the estuaries.
- At high tide, ocean water brings in sediments and sea life that feed and nourish life in the estuary.

Inlets

- *Inlets* are the water-filled spaces between the barrier islands.
- As the tides change, the amount of water in the inlet will change.
- Ocean currents and storms can change the shape of an inlet opening.

Large storms, for example hurricanes, can also cause massive construction or destruction of beaches, barrier islands, estuaries, and inlets because they produce high waves, storm surges, and heavy winds.

NOTE TO TEACHER: Looking at a map of South Carolina with its many beaches, barrier islands, estuaries, and inlets will allow students to visualize these features for better understanding. Pictures of these features on the South Carolina coast would also be helpful.

It is not essential for students to know about harbors or sounds as features. The effects of rip currents are not necessary; longshore currents are the primary current studied in this indicator.

Assessment Guidelines:
The objective of this indicator is to *explain* the effects waves, currents, tides, and storms on the ocean shore zone; therefore, the primary focus of assessment should be to construct a cause-and-effect model of the various ways that beaches, barrier islands, estuaries, and inlets are affected by these events. However, appropriate assessments should also require students to *recall* that beaches, barrier islands, estuaries, and inlets are geologic features of the ocean shore zone; or *infer* changes on the ocean shore zone that occur as a result of waves, currents, tides and storms.